The stock market valuation of intangible expenditures: An empirical examination of US Net Firms

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Abstract

We examine whether stock market fully value intangible assets, especially R&D and Advertising expenses in a specific sample of firms: US net firms along eight years (1996 until 2003). We find that the market value-to-book increases when the return on equity is positive, but also rises as return on equity becomes more negative. We argue that the negative pricing is due the collision of large expenditures in R&D and Advertising that are subject to conservatism accounting practice. Our results are robust when compared with a sample of recent contemporaneous IPOs of US net firms. We are able to conclude that: i) investors look beyond aggregate earnings, ii) that investors value certain components of losses (R&D and Advertising expenditures) positively, iii) capital markets seem to give strong value to firms undertaking such investments, iv) and that the presence of growing R&D and Advertising expenditures, implies that the persistence of losses may have become a weaker indicator of likelihood of liquidation, v) when faced financial distressed, the mergers an acquisitions is the main strategy to exercise the growth option and maximize the value of the firm and vi) consequently analyse loss firms homogenous can lead incorrect specifications.

Key words: Conservatism accounting; intangible assets, equity valuation
JEL Classification: M41**,** M37; G10

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1. Introduction

It is generally accepted that the stock market value firms ultimately reflects the value of its net assets. When most of the assets are physical, such plant and equipments, the link between asset values and stock prices is relatively apparent. In modern economies, however, a large proportion of firms' assets tend to be intangible, such as brand names (Lev and Sougiannis, 1996; Chan, Lakonishok and Sougiannis, 2001). Under the generally accepted U.S. accounting principles, many types of intangible assets are not reported in firms´ financial statements. When a firm has a large amount of such intangibles, the lack of accounting information complicates the task of equity valuation. One such type of intangible asset, business research and development (R&D), has lately been the subject of much attention. Chan, Lakonishok and Sougiannis (2001) report that at the end of 1999, the technology sector and the pharmaceutical industry together accounted for roughly 40 percent of the value of the S&P 500. This interest in part reflects the recent widespread technological change, together with the dazzling growth of science and knowledge industries, which are especially active in R&D. The Internet industry is an interesting example because the rents provided by physical assets are viewed as tiny compared to those provided by intangible assets. In this sense, internet firms typify the increasingly important role that intangible plays in creating competitive advantage in today's fierce global market. Their rapid and worldwide impact on business and communication is now seen by many as a revolution akin to that triggered by early innovations such moveable type, radio, the telephone, and the computer (Lev, 2000, 2001).

The rise in the importance of technology-oriented companies, in particular internet firms, raises the question of whether their stock market value reflect their intangible R&D capital, particularly after the dot.com bubble – March 2000. These firms have few tangible assets. Their prospects are tied to the success of new, untested technologies and hence are highly unpredictable. Large expenditures are usually required at the outset, and the outcome of many research projects is far from assured. The benefits, if any, are likely to materialize much later in the life-cycle of the firm and the life-span of resulting products may be quite short. Under U.S. accounting standards, financial statements do not report intangible assets as R&D spending is expensed. As a result some yardsticks commonly used by investors, such as price-earnings ratios and

market-to-book ratios, may be misstated. We examine whether stock prices fully value intangible assets, especially R&D expenses. Our study adds to the emerging literature in accounting and finance that look at the relevance of conservatism accounting on the valuation of U.S. net firms (Demers and Lev, 2001; Jorion and Talmor, 2000; Rajogopal et al., 2002; Trueman et al., 2000, Keating, Lys and Magee, 2003) in several ways. First, we contrast simultaneously two types of samples: net firms and a selected sample of non-net firms that went public at the same time. The goal is to assess the degree to which prices of net firms and non-net firms are affected by the conservatism effect, i.e., the negative pricing affect both of samples. Second, we split both of samples in two dimensions: i) profit and loss firms because the literature shows that the information impact of earnings is substantially different if firms reporting profits and losses and, ii) in function of their business model, in order to better identify their value drivers. Third, we use longitudinal data (1996-2003). This data allow us to analyze this phenomenon before and after the crash of the dot.com bubble March - 2000. To the best of our knowledge this study covers a longer time span than previously published studies. Our results indicate that: i) investors look beyond aggregate earnings; ii)that investors value certain components of losses (R&D and Advertising expenditures) positively, i.e. as an asset; ii) and that the presence of growing R&D and Advertising expenditures, may imply that the persistence of losses has become a weaker indicator of likelihood of liquidation, in the opposition to the abandonment option theory. We conclude that when faced financial distressed, high-tech firms adopt a strategy of mergers and acquisitions in order to exercise their call option and maximize the firm´s value. In this context, characteristics of loss firms vary along vary dimensions. Treat loss firms homogenous can lead incorrect specifications.

2. Theory and Empirical Evidence on the Pricing of Intangible-Intensive Firms

2.1 Theory and empirical evidence on the pricing of intangible firms

In the context of valuation, Modigliani and Miller (1966) discuss in their seminal paper how accounting earnings are a proxy for the expected unobservable earnings power of firms´ assets. They note that losses complicate the use of earnings-based valuation

models since a loss reduces the ability of reported earnings provide information about earnings power of firm´s assets[1].

In fact, the assumption that a loss is temporary is consistent with the abandonment option approach (Hayn, 1995). The abandonment option suggests shareholders of loss firms will redeploy or liquidate the assets of the firm if losses are persistent otherwise expected to continue (Hayn, 1995; Berger at al, 1996; Burgstahler and Dichev, 1997; Barth, Beaver and Landsman, 1998). According the abandonment option, losses represent a case where current earnings signal future earnings will be sufficiently low so as to make the abandonment option attractive leading to investors to stop valuing the firm strictly on the basis of reported earnings. Empirically, Riffe and Thompson (1998) and Leibowitz (1999) observe differential pricing between positive and negative income.

However, the frequency of firms reporting losses has markedly increased over the last three decades (Hayn, 1995; Collin, Maydew and Weiss, 1997; Collins, Pincus and Xie, 1999; Francis and Shipper, 1999; Joos and Plesko, 2004). This increased in reported losses extends over periods of economic growth and prosperity suggesting that reported losses do not reflect financial distress equally across firms reporting losses. In fact, prior research also suggests that firms that report losses and invest heavily in intangible assets may not be financially distressed when ongoing losses are reported, especially in fast changing intangible industries (Amir and Lev, 1996; Lev and Zarowin, 1999, Lev, 2000, 2001).

As Aboody e Lev (2000) argue, the presence of intangible assts is the major source of information asymmetry between managers and outsiders, because: i) R&D projects are unique to the specific firms, therefore, it is hard to estimate the value of those projects by comparing them to similar projects of other firms, ii) there are no organized markets for R&D and therefore no asset prices from which to derive information (most physical and financial assets have organized marketplaces where price convey information about the value of productivity) and, iii) R&D is expensed on income statements, so no information regarding the value change is reported to investors (accounting rules require periodic recognition of value impairment for other investments).

[1] Traditionally the investigations do not include firms reporting losses (see Beaver, Lambert, and Morse, 1980; Collins, and Kothari, 1989 for example.).

As R&D and adverting are treated as expenses, under the U.S. GAAP, many types of intangible assets are not reported in the firms' financial statements. This procedure reduces directly the profits and misstates the accounting book value of equity and asset values.

Many contributions from the fields of finance, accounting and economics have focussed on the link between market value and intangible assets. However, there is a theoretical gap in much of this literature. The Feltham and Ohlson (1995) FOM model gives the capacity to identify the potential differences between market value of equity (MVE) and book value of equity (BVE) – the "unrecorded goodwill".

As pointed out by Ohlson (1995) OM, under unbiased accounting, in the long run, the expected value of goodwill, which accounts for the difference between the market value of equity and the book value of equity, converges to zero. Otherwise, if permanent abnormal operating income persist, the accounting system is conservative (biased)[2].

In an extension of the OM, Feltham and Ohlson (1995) demonstrated that the persistence of abnormal operating income can be the result of any combination of two factors. First, the conservatism can result from a systematic accounting undervaluation of existing operating assets. In this case, the reported book value of operating assets is lower than the present value of cash flows that will be generated by current and prior investments. The second source of bias results from an accounting reporting system[3], in which the net present value of future investment projects is not reflected in the current financial statements. A typical example is the treatment of research and development expenditures, which in the present investigation is a proxy for growth opportunities. In this context, the current expenditures associated with future growth opportunities would be expensed as opposed to capitalized as an element of net operating assets at the end of the period. As a result, the actual net operating income for the period would be understated. In addition to the operating income effect, net operating assets would be understated because expenditures are not capitalized. In this context, the growth

[2] The notion of "aggressive accounting" where the book value exceeds the market value is regarded by Ohlson (1995) and Feltham and Ohlson (1995) as unrealistic.
[3] The accounting policy selection is exogenous to the OM and FOM. These models abstract away from the frictions due to asymmetric information (Holthausen and Watts, 2001).

opportunities bias associated with the failure to capitalize such expenditures would overstate the "true" abnormal operating income for the period. Summarizing, growth opportunities bias, is a consequence of the failure to capitalize the net present value of growth opportunities as an element of net operating assets (i.e. the present value of future cash flows of the investments in R&D and Advertising)[4].

If implemented, the capitalization of the expenditures (R&D and Advertising) would increase the net operating asset balance. The increased net operating balance associated with this effect would, in turn, increase the operating income for the period in which the capitalization takes place. If the annual depreciation is lower than the normal operating expenses attributed to the investment, the investment component of the growth opportunity would lead to higher abnormal earnings.

Taking care of the conservatism effect, defined in FOM and also by Zhang (2000), annual expenditures on R&D and adverting represent a call on the underlying R&D and advertising growth option. The present value of such growth option (PVGO) could be determined as:

$$PVGO_{r\&d,adverting} = Max\ [E_t(X) - C, 0]$$

$E_t(X)$ is the present value of future cash flows associated with R&D and Adverting growth opportunities; C, the exercise price, is the current expenditure on R&D and Advertising activities. However, such disclosure is not in conformance with generally accepted accounting principles, due to the timing and uncertainty surrounding the estimation of $E_t(X)$. However, if the sequential investment assumption is valid, then observing R&D and advertising expenditures is a clear signal that rational managers exercised the call option, which implied that $PVGO_{r\&d,\ advertiding} > 0$. Consequently, the impact of an incremental dollar of R&D expenditure on equity value should be greater than one dollar[5]. In fact, Hugonnier, Morellec and Sundaresan (2005) in a general

[4] Richardson and Tinaikar (2004) refer a second source of ex-post conservatism, commonly referred to as delayed recognition accounting. Unexpected negative news with an impact on future cash flows generated by the projects are usually reflected in the financial statements, but ignored if the news is positive. Basu (1997) carries out an empirical test of this type of conservatism.

[5] MacCallig (2003) and Joos and Plesko (2004) observed that the market apparently gives sufficient credit to past losers, who are spending heavily on R&D and advertising. Such firms probably face strong

equilibrium theory of lump model show that option value of waiting can severy erodes the value of the investment, even for moderate levels of risk aversion. The example given was technological investments in Internet Sector.

As the current U.S. norms preclude the inclusion of intangible assets in the company's books, R&D and advertising are treated as expenses. These "investments - investment losses" especially in high-tech firms in the start-up phase can persist for long periods without suggesting financial distress. In fact, the conservatism effect has more impact in growth firms, given the fact that the market is pricing (and the accounting systems ignores) the potential success of R&D projects (product innovation), growth of the market size (industry-based) and growth market shares (firm specific). In this context, our purpose is to analysing the impact of conservatism accounting in valuation in a specific industry - Internet, taking in account a firm´s business economics. That is losses will be negative priced when accounting in biased and intangible assets dominate he business strategy of a firm.

2.2 The Pricing of Internet Firms

Given the speed with which Internet firms arose, academic accounting and finance research into the economics of the Internet firms is itself very recent. We briefly summarize what we consider as the major papers in the literature.

Cooper et al (2001) using ninety-five name changes to Internet –related "dot.com" names during 1998 and 1999, document a positive average stock price reaction to the announcement of a firms adding ".com" to its name. This effect produces cumulative abnormal returns on the order of seventy four percent for ten days surrounding the announcement day. The effect does not appear to be transitory in that there is no evidence of a postannoucement negative drift. Same results are obtained by Lee (2001). Lee (2001) shows that announcements of ".com" names changes are associated with significant increases in stock process and trading activity. Schultz and Zaman (2000) examine the acquisition and insider trading behaviour o Internet firms and from vantage point argue that managers of Internet Firms do not act as if they believe their stocks are irrationally overpriced. Schill and Zhou (2001) compare investors´ valuations of

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pressures to cut R&D and advertisings investments, in order to improve earnings at least in short term. Their reluctance to do so, may reflect their managers´ confidence that future prospects are not so black.

Internet carve-outs with those of the parent. They find several examples of parents whose value holding of carve-out Internet subs significantly violate the law-of-one-price by exceeding the market value of the entire parent over an extended period of time. Schwart and Moon (2000, 2001) apply real option and capital budgeting theory to value Internet firms. Meulbroek (2001) finds that, in contrast to insider selling in the general population of firms, sales in Internet-based companies do not produce excess stock returns, suggesting that market participants do not on average interpret managers´ sales as sign of overvaluation. Wysocki (1999) examines the cross-sectional and time-series determinants of message-posting volume on stock message boards on the Internet. Wysocki (1999) uses message-posting activity on The Motley Fool Stock chat boards to test Kim and Verrechia´s (1997) prediction on the relation between trading volume during announcement and the amount of investor private information prior to and during the earnings announcement. Demers and Lewellen (2003) examine the impact of IPO underpricing on website traffic, which is a direct measure of product market performance for internet firms. They find that we traffic in the month after the IPO is positively and significantly associated with initial returns, and the effect is economically significant. The results obtain by these authors also suggest that the marketing benefits of underpricing extend beyond the internet sector and the "hot issues market" of late 1990s.

Demers and Lev (2001) examine the value-relevance of the cash burn rate and the efficiency of business-to-consumer Internet Firms´ stock prices to web traffic data. They conclude that cash burn is significant value-driver, and that the reaction of Internet firms´ stock prices to new web traffic data is not entirely consistent with strong form market efficiency. Hand (2001) assesses the degree of similarities in the cross-sectional pricing of internet stocks during the tumultuous year of 2000. In addition to The accounting and web traffic factors, Hand (2001) explores two proxies for supply and demand forces, namely public float and the extent of short interest in its stocks. The main conclusions are: i) at the peak of Internet prices in March 2000 the market reward losses of web-traffic-intensive firms but did not reward profits, while after the peak the market reversed its view, rewarding profits but not losses and ii) there is no evidence that two proxies for supply and demand forces – the degree of public float and short interest – have been systematically value-relevant for Internet firms. Keating, Lys and Magee (2003) investigates de decline of 45% of the Internet Stock Index during the

Spring 2000. The objective of the investigation was to analyse if the decline of the prices was associated with new disclosures such earnings, analysts' forecasts revisions and web-traffic measures or a "reassessment" by investors to prior pre-existing information. The results show that the decline was modestly associated with new disclosures. However post-decline prices are more significantly explain by 1999 annual data.

Trueman et al (2001a) find that Internet analysts´ revenue forecasts are unsophisticated in two ways. First, their revenues forecast almost always underestimate actual revenues. Second, historical revenue growth has incremental predictive power over analysts´ forecasts. Trueman et al (2001b) observe persistent anomalies in Internet stock returns around quarterly earnings announcements. They find a general run-up in prices in the days prior to the earnings announcement, followed by a price reversal lasting for several days. The magnitude of the market-adjusted returns associated with these price movements exceeds eleven percent over ten day period, and can not be explained by earnings news disclosed or by changes in risk around the earnings announcements. In addition, Rajgopal et al (2003) conclude the network constitute an important intangible of such firms, that is not recognized in the financial statements. Based on Metacalfe´s law (Shapiro and Varian, 1999) they define network as visitors^2-visitors and conclude that network effect created by web site traffic has substantial explanatory power for stock prices over and above traditional summary accounting measures such earnings and book value. They also show that network advantages are positively associated with one-year-ahead and two-year ahead earnings forecasts provided by analysts. When analysing if network advantages are endogenously determined by managerial actions, they found that part of the relevance of network effects stems from the presence of affiliated referral programs and higher media visibility.

Demers and Lev (2001), Jorion and Talmor (2000), Rajgopal et al (2000), Trueman et al (2000c) and Core at al (2003) focus their analyses on the value-relevance of nonfinancial web traffic measures for Internet firms. While each study concludes that web traffic is value-relevant, Jorion and Talmor (2000) find that the value relevance of web traffic materially diminishes over the period February through June 2000. In fact, Core at al (2003) found mixed evidence for the hypothesis that a New Economy subperiod occurred in the late of 1990s in which the relation between equity value and

traditional financial variables differs from previous studies. The regression results show that the explanatory power of traditional financial variables decline in the New Economy subperiod for all subsamples used. They conclude that the New Economy period is not unusual to other subperiods. We can conclude that the majority of studies about Internet firms are concentrated in the period before the crash (March 2000), and main research question was try to identify the factors that explain the prices of such firms. The web traffic variables assumed a very important role, beside the argument that reflects better the chain value of these firms[6].

3. Data

We compile our sample firm list from the Internet Stock List[7]. We start with a list of 242 firms quoted on the 27th July 2003. In order to control for survivor bias, we track the index on 6/3/2002 (286 firms), 2/21/2001 (382 firms), 3/24/2000 (354 firms) and 5/25/1999 (108 firms) as published in the Morgan & Stanley reports (the technology IPO yearbook – 8th and 7th edition, the B2B Internet report and the Internet company handbook). Our initial sample consists of 658 internet firms. Missing observations lead us to discard 24 firms. We also deleted 12 far outliers from our sample to preserve the dimension of the sample[8]. Following previous studies we cover the period 1996-2003 as the year 1996 is usually associated with the birth of the net firms (Copeland et al. 2000; Schultz e Zaman, 2001; Damodaran, 2001; Core et al. 2003).

ISDEX	6/27/2003	6/3/2002	2/21/2001	3/24/2000	5/25/1999
Number of firms selected	242	286	382	354	108

[6] For a comprehensive analysis of the rise and fall of Internet Stocks, see Ofek and Richardson (2001, 2002).

[7] The Internet Stock List was compiled by Internet.Com. Currently, different internet stock indexes are available in http://www.bullsector.com/internet.html.

[8] Eviews computes two statistics: "inner fences" and "outer fences". Inner fences are defined as the first quartile minus 1,5*IQR (interquartile range) and the third quartile plus 1,5*IQR. The data outside inner fences are known as outliers. To further characterize outliers, the Eviews also defines outer fences, as the first quartile minus 3,0*IQR and the third quartile plus 3,0*IQR. The data between inner and outer fences are defined near outliers, and those outside the outer fences are referred as far outliers. Analytically: "*inner fence*" = [1.ºQ-1.5*IQR; 3.ºQ+1.5*IQR] and "*outer fence*" = [1.ºQ-3*IQR; 3.ºQ+3*IQR] (Eviews, version 5.0, pp.397).

The data was obtained from Compustat Active and Research Files at the end of the fiscal year (see appendix A for description of the variables). Similarly to Core et al (2003), Hand (2001), we set the variables R&D and Advertising equal to zero, when their values are missing, with the goal of preserving the sample size. Contrarily to Collins, Maydew and Weiss (1997), Burgstahler and Dichev (1997), Barth, Beaver and Landsman (1998), Collins, Pincus and Xie (1999) and Joos and Plesko (2004) outside the universe of net firms and Trueman, Wong and Zhang (2001c) and Hand (2001) in the context of net firms, we include in our sample net firms with negative BVE[9]. According to Zhang (2000) firms may present a negative value for BVE in consequence of an aggressive conservatism effect, especially in a growth phase. Hence a negative coefficient on book value represents a need to adjustments in operating investment assets that are needed to generate the stream of expected future earning[10].

Assuming that the information impact of earnings varies between profit and losses reporting firms, as suggested by Hayn (1995), Chamber (1996) and Subramanyam and Wild (1996), and to take in account the heterogeneity of business models of internet firms, we split the sample of internet firms in four groups[11,12]:

Internet firms	**Profit Group**	**Loss Group**
R&D	Profit_R&D	Loss_R&D
Advertising (Adv)	Profit_Adv	Loss_Adv

If R&D investment is larger than advertising, the firm is considered an R&D firm.

[9] Core et al (2003) observe that deleting firms with negative book value of equity removes a greater percentage of young (7,5%) and high-technology firms (5,6%).
[10] Amir and Lev (1996), Penamn (1998) and Francis and Shipper (1999) obtain for certain years, a negative coefficient in the variable BVE. They considered this result hard to interpret.
[11] The Morgan &Stanley in the: "The technology IPO yearbook" – 8th and 7th edition subdivided the internet sector in eleven sub sectors: 1) internet portal, 2) internet commerce, 3) internet infrastructure, 4) internet B2B software, 5) internet financial services, 6) vertical portal, 7) internet infrastructure services, 8) internet consulting & application, 9) Internet advertising & direct marketing services, 10) B2B commerce e 11) multi-sector internet companies. However, partition of the sample in these eleven sub-sectors was not possible due the small number of observations for some sub sectors.
[12] We identify the group R&D with the Business-to-Business internet firms (B2B) and the advertising sample with the Business-to-Consumer internet firms (B2C).

In order to control: i) the effect dot.com bubble documented by Cooper et al (2001), Lee (2001) and Bartov Mohanram and Sethamraju (2002) and ii) the cluster effect of IPOs in time documented by Ljungvisq and Wilhelm (2003) and Loughran and Ritter (2003) among others, we selected a match sample of contemporaneous IPOs of net firms – non net firms sample[13]. A match sample allows us to guarantee the robustness of our results. For this sample we adopt the same partition as for the net firms' sample. In figure 1 we can observe the number of IPOs under the period by scrutiny in both of samples.

[Insert figure 1]

3.1 Characteristics of our samples

Before 1996, few net initial public offerings (10.93 percent) took place. Out of a total of 622 net firms' offerings, 33.76 percent left the market. However, a generalized failure can not be inferred from this evolution as mergers and acquisitions (M&A) were the main abandonment form. Only 1.43 percent of firms went bankrupt. Opler and Titman (1995) and Fluck and Lynch (1999) consider mergers of distressed firms (89.05 percent of net firms that left the market reported losses in the last independent year) as a means of avoiding the undesirable outcomes resulting from the declaration of bankruptcy. The exercise of the growth option via merger enables the firm to maximize its value, allowing the continued utilization of the distressed firm's current business technologies, subsequent to the merger, and the bundle of assets to be kept intact[14].

[Insert table 1]

In table 2, we conclude that is much higher the number of non net firms IPOs before 1996 (24,63%). However, in both sample that is clearly the effect of cluster in the time of IPOs in the period of the dot.com bubble (69,30% in the net firms and 50,28% in non net firms – see also figure one). The M&A is the principal strategy to leave the market in both samples, but the percentage of the firms that left the market with profits in non net firms is much higher (36,24%) than in the sample of net firms (only 10,95%).

[Insert table 2]

[13] We are grateful to Darren Hawkins, of NASDAQ International Department in supply the data sample of the IPO that occurred in NASDAD between 1990 and 2002.

[14] As the specific nature of the majority of tech firms' assets renders their residual value very low (Berger, Ofek and Swary, 1996), liquidation is not an attractive strategy. The adaptation potential of these assets is also reduced (Burgstahler and Dichev, 1997).

In table 3, we report that 517 (of a total of 622) net firms are classified in high tech sectors, following the standard definitions used by Collins, Maydew and Weiss (1997), Francis and Schipper (1999) and Loughran and Ritter (2003). The percentage of non net firms is half (47,69%). In this context, it is reasonable to assume that the highest value used of the intangible and firm-specific assets of the distressed firms is internally generated, enabling the continued use of the firm's current business technologies within the post merger entity. The growth options generated by R&D and Advertising provide a lower bound to the future abnormal earnings produced by the merger entity.

[Insert table 3]

As we can observe in table 4, besides the highly asymmetrically distribution of the variables, the mean of the ratio R&D/Sales over the period 1996 through 2003 in the net firms sample is 53% (the median is 15%). For non net firms the value for the mean is much higher 157%, but the median value of this ratio is only 4%.

[Insert table 4]

In Table 5 we split the sample in profit and loss firms. We find no statistically significant differences related to the mean and median of the variables R&D and ADV between the profit (20 percent) and loss (80 percent) making firms. However when we analyse the median of the ratio R&D over sales, the difference is statistically significant throughout the period under scrutiny[15]. The investment in R&D (intangible assets) in the loss group is 18.5 percent of sales totalling 33.75 millions of dollars (median values), while in the profit group the investment in R&D is 3.3 percent for a larger sales volume of 98.53 millions of dollars (median values). Loss making firms are the ones that invest heavily in intangible assets, in an attempt to appropriate the benefits arising from the "winner-takes-all-business" strategy proposed by Noe and Park (2001). These authors developed a model in which web-based firms (net firms) spend profligately on advertising and R&D while generally making losses. The rationality of their model is based on the winner-takes-all structure of high-fixed costs, low-marginal costs, markets for information goods. These competitive strategies generate returns that are highly positively skewed, following a Pareto-like distribution. In addition, since large expenditures in the first period produce valuable growth options in later periods, which are treated as expenses using traditional accounting rules, the financial valuation

[15] Due the fact that the distribution of the variables is very asymmetrical, we concentrated the analyses in the median values.

of internet firms, may actually be negatively related to performance using standard accounting measures of profitability, that fail to capitalize these opportunities.

[Insert table 5]

For the sample of non net firms the results are quite similar (table 6). The differences related to the median of almost variables are statically significant. Related to the ratio R&D/sales the loss group of firms (45,5%) has the same behaviour of the net firms. These firms is invest heavily in R&D (the ratio R&D/sales is 17,6%)) when sales totalling 33,53 millions of dollars (median values). The profit group (54,5% of non net firms) with 103,8 millions of dollars in sales invest a residual value in this ratio. It is also important to notice that for both samples the market value of equity is higher than for loss group under all period.

[Insert table 6]

Interestingly is even the crash (March 2000), reflected in the decreasing of the market value of equity, the firms especially the loss group, continue to invest heavily in the R&D, as predicted by the model of Noe and Park (2000).

[Insert figure 2, 3]

[Insert figure 4 and 5]

Based on theses preliminary results, i.s. the partner of the behaviour of the variables R&D and MVE, we can conclude that the conservatism effect has more impact in growth high-tech firms.

Next, we test the significance of changes overtime by regressing each characteristic on annual time trend t, and report in the last column of the table, the significance level of the coefficient estimated for t. We use O.L.S. to test for trends in means and medians regressions.

[Insert table 7]

For sample of net firms, the age augmented over the period. The increase in revenues is accompanied by the investment in R&D, which is reflected in the ratio R&D/sales. The variable liabilities – total also increase over the period. Interesting is the fact that the trend of the variable assets is only significant at 10% level, which mean that the majority of assets in these type of firms are intangibles assets. About the ratio

MVE/BVE[16] it is important to notice that it reach the maximum in 1999, but this evolution is not statistically significant. Again, the strategy in continue to invest, particularly in intangible assets even the decrease of market value after 2000 and the persistence of negative earnings.

[Insert table 8]

Establish the comparison with the sample of non net firms, we observe that the level of significance of the variables are much higher than in the sample of net firms, but the pattern of evolution is quite similar. Even the increase in revenues over the period the earnings remain negative, but the value is less than in net firms. The investment in R&D and in assets has statistically significance. Interesting is notice that the liabilities increase at the same time the long term debt, contrary to the net firms.

These results are consistent with the model proposed by Noe and Park (2000), which suggest that high-tech firms invest heavily in intangible assets in order to generate valuable growth options in the future (in our samples the majority of the firms are classified in high-tech sectors). This strategy is a clearly signal to the market that the managers exercise de call if it is in the money. Recall that the percentage of bankruptcy in both samples is residual comparing with the strategy of M&A.

3.2. The standard Ohlson (1995) model and hypotheses

Ohlson (1995) derives the following valuation model (OM) based on the standard assumptions underlying the dividend discount model, the clean surplus relation (CSR), and an assumed stochastic process for abnormal returns[17]:

$$P_t = bv_t + \alpha_1 x^a_t + \alpha_2 v_t \qquad (1)$$

where P_t is the stock price at time t, bv_t is end-of-year book value of equity and x^a_t is abnormal earnings for period t, and v_t is other non-accounting value-relevant

[16] In the calculation of the ratios, especially the ratio MVE/BVE we follow the methodology suggest by Chan, Lakonishok and Sougiannis (2001): we aggregate separately the items in the numerator and denominator. The virtual of this procedure (compared to calculate the average of he ratios across firms) is that it is insensitive to outliers cases where a firm has very low or no earnings, for example.

[17] The OM is based on the well-known residual income valuation model (Preinreich, 1938 and Edwards and Bell, 1961) and is defined as $P_t = bv_t + \alpha_1 x^a_t + \alpha_2 v_t$, where $\alpha_1 = \frac{w}{(R_f - w)} > 0$, $\alpha_2 = \frac{R_F}{(R_f - w)(R_f - \gamma)} > 0$, x^a_t - abnormal earnings, bv_t is the book value of equity and v_t other non-accounting information. The goodwill is attributed to abnormal earnings $P_t - bv_t = \sum_{\tau=1}^{\infty} R_f^{-\tau} \left(x^a_{t+\tau} \right)$.

information, which is assumed to be independent of net income and book-value of equity. Substituting the abnormal earnings in the above equation, the price can be expressed as a function of current period earnings and book value at time t, lagged book value (i.e. bv_{t-1}), and other information, we obtain:

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{it-1} + \alpha_2 NI_{i,t} + e_{it} \quad (2)$$

Where MVE is market value of equity, BVE is the book value of equity and NI the net income[18]. Notice that we delete the unspecified "other information" variable (v_t), and replace it with an intercept an error term. The intercept allows for nonzero mean pricing effects of the omitted other information, which becomes part of the error term[19].

This version of the OM is appropriate for our study as we also intend analyse the relationship price-losses (current losses) which is a consequence of an aggressive conservatism accounting, especially in growth phase. Notice that the media and median of age in net firms samples is 4,36 and 4 years respectively, and in non net firms sample the values are quite similar (4,79 years for media and 4 yearns for median) .

We use beginning-of-year as opposed to end-of-year book value in equity valuation (2), because under the clean surplus relationship, current earnings are including as part of end-of-period book value. If we used BVE_t instead of BVE_{t-1}, earnings would effectively appear on the right-hand side of equation twice (the first time as an independent variable, the second time as part of the independent variable BVE_t). Given the "scale-effect" underlined by Easton and Sommers (2003), we apply the logarithmic transformation to the variable MVE[20,21].

In line with Fama and MacBeeth (1973), we base our inferences on the average of slopes from the regressions estimated separately for each year from 1996 to 2003.

[18] As Francis and Schipper (1999) we assume that market value and intrinsic values follow the same construct.

[19] Recall that the variable v_t, aggregate other value relevant events that have not yet been incorporated in financial statements. According to Ohlson (1995:668), v_t is assumed to be independent of NI and BVE. If this assumption is correct, the omission of this term from our empirical model will not affect the estimated coefficients on earnings and lagged book value.

[20]We did not scale both the variables (dependent and independent) by the variable BVE, because we intended to include also the firms with negative BVE. We excluded the variable "sales" and "total assets – TA", due the fact most of the start-up internet firms have low value for sales and the investments are concentrated in intangible assets. In this context, as pointed by Fama and French (1998), scaling the variables by sales or TA augmented the influence of influential observations – outliers. We also excluded the lagged MVE, due to the high valuation of these firms, especially during the "dot.com bubble" period of 1999 and 2000. The number of shares is not used due to the effect of look-up period, as pointed out by Ofek and Richardson (2002, 2003).

[21] With this transformation we change the distribution of the dependent variable, but when observe the Jarque-Bera and Kolmogorov-Smirnov tests, we conclude that the distribution is normal. It allows us to use the OLS method in estimating regressions. See also appendix B.

The objective is to analyse if the market prices differently earnings and book value, the primary value indicators, according to OM, as the internet sector/net firms matures. Thus equation (2) takes the following form:

$$MVE_{it} = \alpha_0 + \sum_{j=1}^{H} \alpha_{j,t} F_{i,j,t} + e_{it} \qquad \text{for } i = 1,2..N \qquad (3)$$

where $F_{i,j,t}$ is the explanatory factor j for firm i in year t, H is the number of explanatory variables, N is the number of firms. The null hypothesis that the average of year-by-year regression slopes is zero. That is

$$H_0 = \frac{\sum_{t=1}^{T} \alpha_{jt}}{T} = 0 \text{ for } t = 1,2,...T \qquad (4)$$

According, Fama and French (1998) the advantages of this approach are: i) the year-by-year variation in the slopes includes the effects of estimation error due to the cross correlation of the residuals of individual firms and[22] ii) other great advantage is to work with a large samples per annual regressions, which increases the precision of the slopes and reduces their year-by-year volatility. In fact, the survivor bias is a very important factor that we need to control in the Internet sector.

Early studies that analyze value relevance (statistical dependence between the financial statement measures (earnings, book value of equity) and the market assessment of firm value of losses) conclude that the in formativeness of earnings varies between profit and loss making firms (Hayn, 1995; Chambers, 1996). Profits are regarded as enjoying stronger information content than losses, in equity valuation. Losses are considered less informative due to their transitory nature or the shift in importance from earnings toward liquidation values when large and lasting losses are reported. Recent studies assume that some losses may be related to investment, rather than value destruction. McCallig (2003) shows that loss-making firms in the 1970s reported losses for shorter periods of time and were similar to profit making firms than the firms in the 1990s. Joos and Plesko (2004) contend that as the income statements of young firms are likely to be distorted by large investments in intangible assets, the reported losses are not a good predictor for future performance. Our first hypothesis (H1) is:

H1: Earnings (negative) will have a negative association with market value.

[22] We correct standard errors using the Newey and West (1987) adjustments, with six lags, for serial correlation dependence in coefficients, following Core et al. (2003).

Formally this implies estimation of the following equation:

$$MVE_{it} = \alpha_0 + \alpha_1 NI_{it} + e_{it} \qquad (5)$$

Where the variables are as described earlier.

In order to investigate if the negative pricing of losses is caused by an omitted correlated variable[23], or more specifically, the simple earnings capitalization model is misspecified due to the omission of the variable BVE, as pointed out by Collins, Pincus and Xie (1999), our second hypothesis (H2) is that:

H2: BVE is positively related to MVE.

The positive association between the variable BVE and MVE for both profit and loss firms is sustained on the assumption that if negative earnings cause investors to assess a higher probability that a firm will abandon its resources, the variable BVE provides value relevant information on abandonment value for firms most likely to be liquidated (i.e. the abandonment option approach as sustained by Hayn, 1995; Berger, Ofek and Swary, 1996; Burgstahler and Dichev, 1997; Barth, Beaver and Landsman, 1998); and if current losses are a consequence of large investments in intangible assets, then the book value, in line of OM, can be a good proxy for expected future normal earnings. Book value conveys information on the funding available to continue investments in these firms. According to Collins, Pincus and Xie (1999), the coefficient on earnings should capture the direct effect of earnings in the price, and the coefficient on the end-of-period book value would capture the indirect effect of earnings on stock prices through its effect on end-of-year book value. This hypothesis is empirically examined by estimating model (6):

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{it-1} + \alpha_2 NI_{i,t} + e_{it} \qquad (6)$$

In general, investment in intangible assets has two effects on earnings: the expensing in the current period reduces earnings, but revenues generated from past investment in intangible assets simultaneously increase earnings. In early stages of development (start up phase) current period expensing of investments in intangible

[23] According to Greene (2000), when a relevant variable is positively correlated with the dependent variable and negative (positively) correlated with the included variable, omitting the relevant variable, will induce a negative (positive) bias in the coefficient of the included variable.

assets dominates current period revenue generation. Thus the overall effect is to reduce reported earnings. However, we expect the market to value expensing in intangibles positively. Frazen (2000) provides evidence in this direction. She finds that markets value positively research expenses of loss making firms. Joos and Plesko (2004) also show that investors reward the research component of loss making firms with positive returns. Sougiannis (1994) shows that total research investments are positively valued by the market, and that the investment value of research is reflected in earnings. He finds that the information related to research that is conveyed in earnings (before research expenses) is valued more than the information conveyed by total research expenses. Based on these arguments and in our preliminary results that show that both of firms invest heavily in intangible assets in order to generate valuable growth options in the future, our third hypothesis (H3) is:

H3: There is a positive relationship between investment in research and advertising and market value of firms.

Formally this is equivalent to the following equation:

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_RD_{it} + \alpha_3 RD_{it} + e_{it} \quad (7)$$

In order to test this hypothesis, we disaggregate the variable NI (NIB_RB represents earnings before research expenses and RD represents research and development expenses). We also estimate the following equation:

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_ADV_{it} + \alpha_3 ADV_{it} + e_{it} \quad (8)$$

where NIB_ADV represents earnings before advertising expenses and ADV represents advertising expenses. If R&D and advertising expenditures are seen by the market as proxies for future growth opportunities then they can pick up information about expected profits missed by the current earnings. To test this hypothesis, we adjust the variable earnings to the *items* R&D and Advertising[24].

4. Results

[24] Sougiannis (1994), Chan, Lakonishok and Sougiannis (2001) argue that like R&D, advertising expenditures have some elements of long-term investments (although the effective lifetime of advertising expenditures may be comparatively shorter).

We examine the relevance of our hypotheses by estimating equations 5-8 through ordinary least squares regressions as suggested by Fama and McBeth (1973). To test hypothesis 1 we regress MVE on net income. We use income before extraordinary items (NI_BE) as a proxy for comprehensive income, which is the measure of income under the clean surplus relation in OM. Table 9 reports the results.

[Insert table 9]

For loss net firms (as for all years), the mean coefficient is negative and statistically significant at the 5% level of significance[25]. Moreover, the negative coefficient is robust when we substitute income before extraordinary items for bottom line earnings (not reported results)[26]. In line with previous findings the value relevance of earnings increases with their persistence. In fact, the adjusted R-squared is much higher (31.25 percent against 12.05percent) for profit net firms than for loss making firms. Notice that the coefficient of loss group is -0.011 which imply that the MVE of this group increases 1.1%[27].

[Insert table 10]

When we compare the results with the results obtain for the sample of non net firms, the results are quite similar. The coefficient on income before extraordinary items is also negative, which means that the MVE increases 1.16% with losses. However, the coefficient is not statistically significant. As we expected, the explanatory of earnings increase with their persistence. In fact, in profit group the adjusted R- squared is much higher (37.17% against 10.30% in loss group).). Based on these results we do not reject H1.

In order to evaluate if the negative pricing of losses is due to the effect of a correlated omitted variable as suggested by Collins, Pincus and Xie (1999), we analyze the matrix of correlations for profit and loss making firms in both samples (Table 11). The correlation between MVE, BVE, NI an NI_BE for profit and loss making firms differs in statistically terms in both samples. However, the correlation is positive and

[25] An analysis of yearly regressions reveals the presence of heterocedasticity for some years as indicated by the White (1980) statistic (details not shown). For these years, we correct standard errors based on White test which assume that the heterocedasticity form is unknown. For years 2001, 2002 and 2003 the normality assumption is rejected under the test of Jarque-Bera, but was accepted according the Kolmogorov-Smirnov test.

[26] The adjusted R^2 when we regress model (5) for the sample of net firms using the bottom line earnings is 27.68% for the profit group and 11.98% for the loss group. In the sample of non net firms the values are: 33.95% and 9.48% for profit and loss group respectively

[27] Note that the values of earnings will all non-positive. A positive coefficient on this variable suggests that MVE is *lower* for firms with larger losses, while a negative coefficient suggests the opposite.

statistically significant for the variables MVE, R&D and ADV in both samples and both groups, which suggest that these variables are good proxies for future growth options.

[Insert table 11]

In Table 12 we estimate model 6 for the net firm sample. When we introduce the variable BVE in the model, the variable NI_BE turns out to be negative but not significant at a statistically meaningful level. In other words, the omission of the variable BVE induces a negative bias in the coefficient on earnings for loss firms in equation.

[Insert figure 6]

Notice also, that the adjusted R^2 rises substantially from a level that is 12 percent when BVE is excluded from the model for loss making firms (Table 9) to about 27 percent when BVE is included. BVE thus has a substantial incremental explanatory power, beyond earnings, in equity valuation for loss firms. As demonstrated by the OM, BVE is a proxy for expected future normal earnings. The variable BVE conveys information on the funding available to continue investments in loss firms. As expected, for profit making firms there is only a small increase in the explanatory power of the regressions when BVE is added to the earnings capitalization model (31.25 percent to 38.27 percent). For these firms, the most important value driver is earnings. The results are similar when we regress the model 6 on the sample of non net firms. Based on these results we do not reject H2.

[Insert table 12 and 13]

In equation 6 the intercepts are significant and positive, for both samples and both groups of firms. This is consistent with other value-relevant information with positive pricing effects being excluded from the empirical model. Pricing effects would be positive, for example, for unrecorded assets having earnings effects that are not fully recognized in current earnings (Barth, Beaver and Landsman, 1998).

In order to empirically test H3, we regress MVE on earnings before R&D and advertising for both groups of firms in both of samples. As expected, R&D expenses are relevant for loss making firms. The coefficient α_3 assume the value 0.016 and 0.029 in net and non net firms respectively and is positive and statistically significant at 5%. We could interpret this result as the investors pricing theses variables as assets besides the U.S. GAAP treat theses items as expenses. Capital markets seem to give strong value to the firms that undertaking such investments. The variable earnings adjusted by R&D, remains negative but not statistically significant only in the loss net firms. In profit

groups, this variable besides not statistically significant has a negative coefficient, which could indicate for that group, and in line with the results of Souginnais (1994) that market reward that variable as an expense.

[Insert table 14 and 15]

For model 7, we were able to estimate only the model for the net loss firms due to the smaller number of firms in the profit group. ADV is priced positively as an asset. The variable earnings adjusted for advertising expenses remains negative, but not statistically significant. The asymmetry across loss and profit making firms in valuation of R&D and ADV leads us to believe that the earnings and BVE are likely to vary overtime, as the firms evolve and mature. For profitable firms the relation between price and earnings is positive and not largely affected by current expenses originated by intangible investments. Earnings are the most important value driver for healthy firms as the OM predicts but not for loss making firms.

[Insert table 16 and 17]

In order to assess the validity of our results before and after the dot.com bubble (March, 2000) we estimated all regressions for periods before and after the crash. Chow tests that compare the stability of the regressions are reported in table 18. As it can be observed the regressions show a structural break in only one set of regressions (profit-making non-net firms).

[Insert table 18]

5. Summary and conclusions

We analyze the value relevance of intangibles in the net industry for a newly assembled data set for the period 1996-2003. Unlike previous findings we show that earnings have a divergent influence on market value of profit and loss making firms due the collision of large expenditures in R&D and Advertising that are subject to the conservatism accounting practice. We find that book value of equity has a similar influence on both groups of firms. Market also values negatively expenditures in research and development in firms that report profits but values positively expenditures in both research and development and advertising in loss reporting firms. The robustness of theses results is confirmed when compared with contemporaneous IPOs of net firms and submitted the data to the fixed effects, in order to control the cross section effect, due the effect reputation and dimension of some firms (see for example Rajgopal

et al,2003 and Demers and Lev, 2001) and the dot.com bubble effect (time effect)[28]. The results suggest: i) that investors look beyond earnings, ii) value positively certain components of losses (R&D and Advertising), iii) standard earnings models may not be appropriate for valuing high-tech firms, especially the loss making firms at the early stage of development due the aggressive conservatism accounting effect faced by these firms; iv) the strategy of growing investments in R&D and Advertising due the persistence of losses implies that the persistence of losses may have become a weaker indicator of likelihood of liquidation in opposition of the abandonment option, v) when faced financial distressed, the mergers and acquisitions is the mains strategy followed by these firms in order to exercise the growth option and maximize the firm value, vi) consequently analyse loss firms homogenous can lead incorrect specifications. In order to draw further conclusions it would be desirable to compare the value relevance of intangibles across different industries and across different business cycles.

[28] The results are available from the authors.

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Fig.1 The number of IPOs by Internet firms and Non Internet firms by year

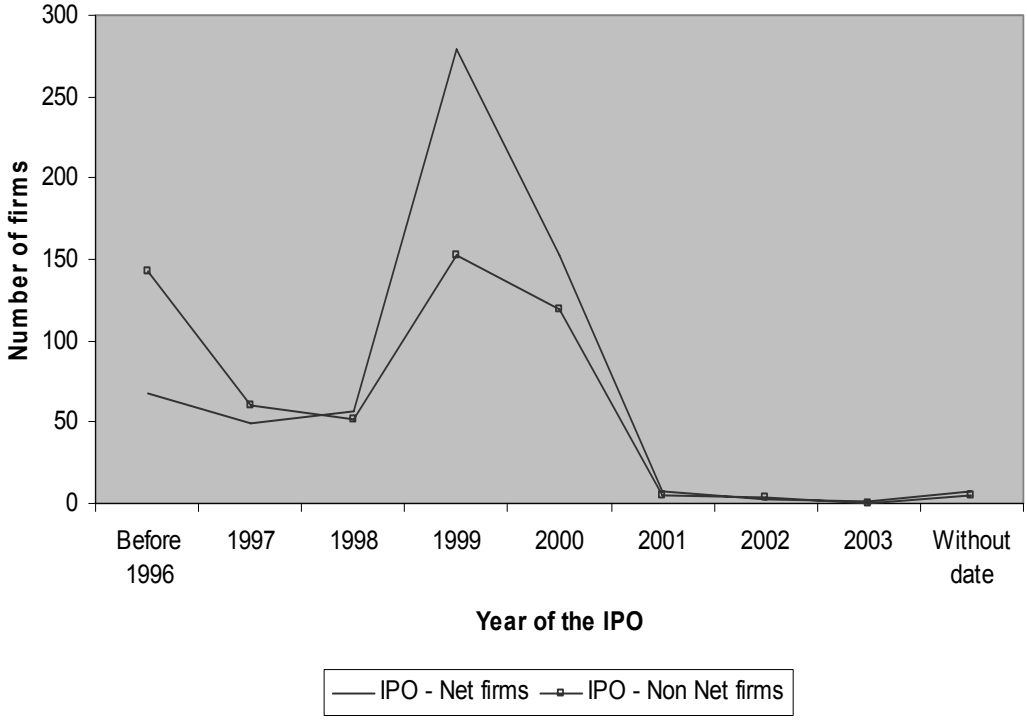

Fig.2 Evolution of the ratio R&D/sales (median) over the sample period in the net firms set

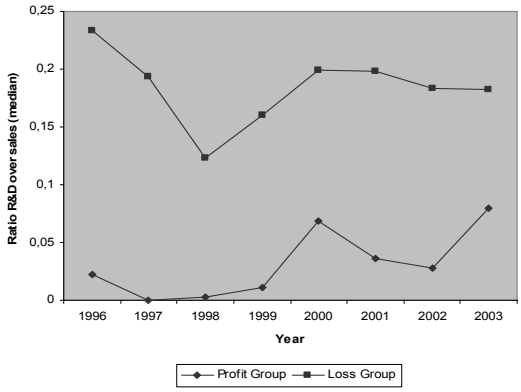

Fig.3 Evolution of the MVE (median) over the sample period in the net firms set

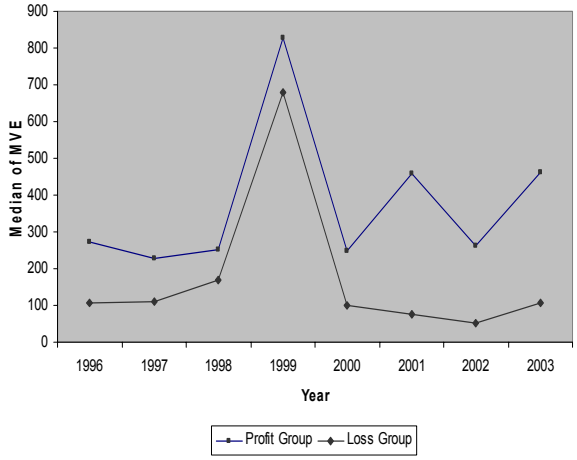

Fig.4 Evolution of the ratio R&D/sales (median) over the sample period in the non net firms set

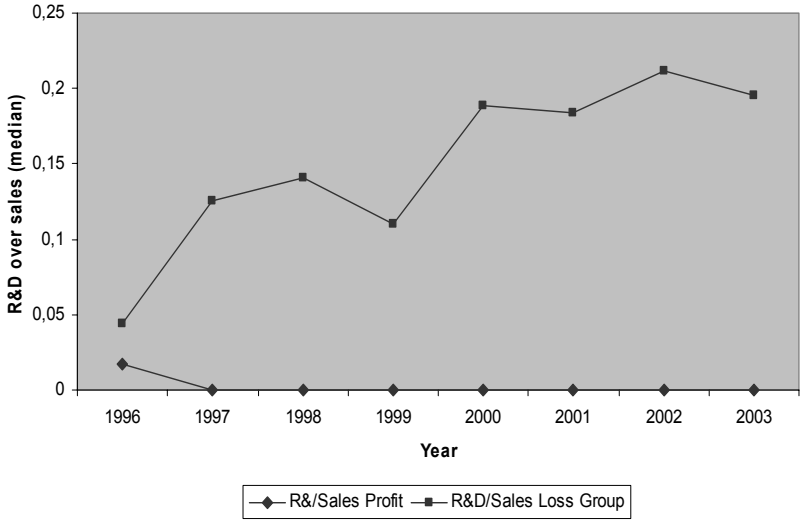

Fig.5 Evolution of the MVE (median) over the sample period in the non net firms set

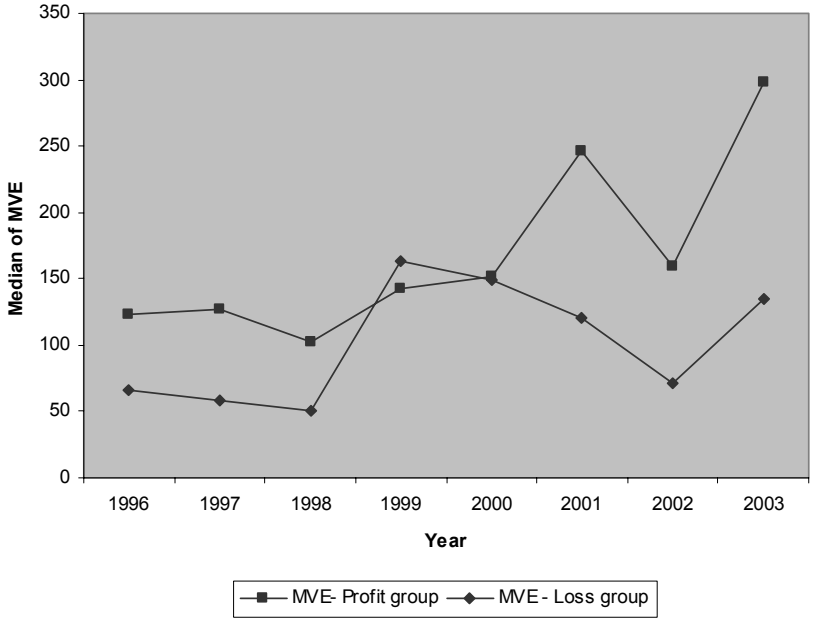

Fig. 6 The relationship between coefficients estimates before and after control for the effect of the variable BE I non net and net firms sample respectively

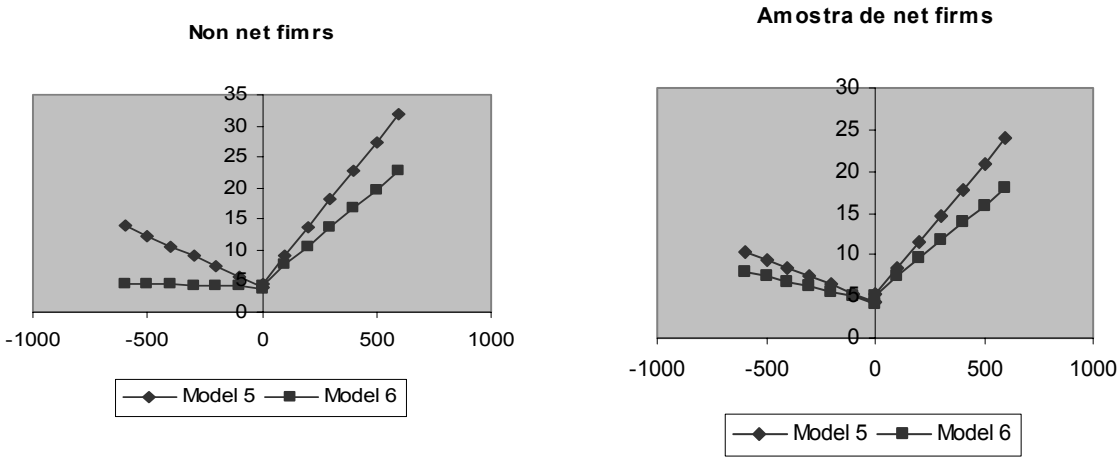

TABLE 1
The sample: Net Firms

Date of the IPO	Global sample	Partition of the sample		N.º of IPO by year	% IPO	Results reported by the firms at the date of go out the market			Reason for leaving the market				
		Profit	Loss			Losses	Profits	Total	M&A	Bankruptcy	Liquidation	Private	Other
≤ 1996	71	34 (48%)	37 (52%)	68	10.93%	0	0	0					
1997	115	49 (43%)	66 (57%)	49	7.88%	0	0	0					
1998	154	47 (31%)	107 (69%)	56	9.00%	2	2	4	4				
1999	430	80 (19%)	350 (81%)	279	44.86%	12	1	13	12	1			
2000	527	74 (14%)	453 (86%)	152	24.44%	37	4	41	39				2
2001	428	36 (8%)	392 (92%)	7	1.13%	59	9	68	60	1	2		5
2002	367	54 (15%)	313 (85%)	3	0.48%	34	2	36	30		3		3
2003	307	101 (33%)	206 (67%)	1	0.16%	43	5	48	34	1	4	2	7
Without date of IPO				7	1.13%								
Total	2399			622		187 (89.05%)	23 (10.95%)	210	179 (85.24%)	3 (1.43%)	9 (4.29%)	2 (0.95%)	17 (8.10%)

TABLE 2
The sample: Non Net Firms

Date of the IPO	Global sample	Partition of the sample		N.º of IPO by year	% IPO	Results reported by the firms at the date of go out the market			Reason for leaving the market				
		Profit	Loss			Losses	Profits	Total	M&A	Bankruptcy	Liquidation	Private	Other
≤ 1996	143	81 (57%)	62 (43%)	143	26,43%	2	0	2	2				
1997	191	109 (57%)	82 (43%)	60	11,09%	1	2	3	3				
1998	212	120 (57%)	92 (43%)	52	9,61%	7	2	9	9				
1999	356	182 (51%)	174 (49%)	153	28,28%	14	11	25	20	1			4
2000	445	195 (44%)	250 (56%)	119	22,00%	19	13	32	24	4			4
2001	402	140 (35%)	262 (65%)	5	0,92%	16	9	25	22			1	2
2002	374	145 (39%)	229 (61%)	4	0,74%	16	7	23	17			2	4
2003	336	146 (43%)	190 (57%)	0	0,0%	20	10	30	25				5
Without date of IPO				5 [1)]	0,92%								
Total	***2459***			***541***		*95 (63,76%)*	*54 (36,24%)*	*149*	*122 (81,88%)*	*5 (3,36%)*	*0 (0,00%)*	*3 (2,01%)*	*19 (12,75%)*

Table 3
Partition of both samples by sector of activity

	(SIC – *Standard Industrial Code*)	*Net Firms*		*Non Net Firms*	
		Total	%[4)]	Total	%[4)]
2834	Pharmaceutical Preparations [1)]	1	0,16%	22	4,07%
2836	Biological Products (No Diagnostic Substances) [1)]			17	3,14%
3576	Computer Communication Equipment[1)]	17	2,73%	6	1,11%
3577	Computer Peripheral Equipment, NEC[1)]	2	0,32%	8	1,48%
3661	Telephone & Telegraph Apparatus[1)]	13	2,09%	10	1,85%
3663	Radio & Tv Broadcasting & Communications Equipment[1)]	10	1,61%	8	1,48%
3674	Semiconductors & Related Devices [3)]	7	1,13%	33	6,10%
3826	Laboratory Analytical Instruments[3)]			8	1,48%
4812	Radiotelephone Communicatio"ns[1)]	3	0,48%	9	1,66%
4813	Telephone Communications (No Radiotelephone) [3)]	24	3,86%	18	3,33%
4832	Radio Broadcasting Stations [1),2)]	2	0,32%	9	1,66%
4841	Cable & Other Pay Television Services[2)]			9	1,66%
4899	Communications Services, NEC[1),2)]	7	1,13%	6	1,11%
5961	Retail-Catalog & Mail-Order Houses[1)]	31	4,98%		
7370	Services-Computer Programming, Data Processing, etc[3)]	183	29,42%		
7371	Services-Computer Programming Services[3)]	8	1,29%		
7372	Services-Pre-packaged Software[3)]	160	25,72%	68	12,57%
7373	Services-Computer Integrated Systems Design[1),3)]	34	5,47%	14	2,59%
7374	Services-Computer Processing & Data Preparation[3)]	2	0,32%		
7389	Services-Business Services, NEC [1)]	13	2,09%		
8731	Services-Commercial Physical & Biological Research[3)]			13	2,40%
	Total	517	83,12%	258	47,69%

Classification by "*high tech sector" according:*
[1)] Collins, Maydew e Weiss (1997);
[2)] Francis e Shipper (1999);
[3)] Loughran e Ritter (2003);
[4)] Percentage of firms based in the total sample.
The total of net firms – 622 is distributed by 74 sectors; the non net firms are distributed by 158 sectors.

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TABLE 4

Panel A: Descriptive statistics of variables in the net firms data set

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Age	4.38	4.00	14.00	0.00	1.58	1.90	9.45
Sales	144.61	45.09	13,892.60	-2.62	498.64	19.05	492.21
Assets	365.20	90.80	30,185.00	0.03	1,425.66	12.66	202.13
NI_BE	-74.59	-15.97	447.18	-4,961.30	293.49	-9.16	107.15
LT	175.96	21.56	24,130.92	0	1,023.31	15.16	277.20
LTD	52.18	0.19	6,497.00	0	276.75	12.15	209.64
RD	14.42	4.70	1,049.00	-106.90	43.78	13.19	250.56
ADV	4.82	0.023	321.40	-0.70	17.42	7.71	86.94
BVE	257.21	80.95	21,586.10	-1,203.70	826.61	12.79	250.03
MVE/BVE	-1.212.53	2.12	44,177.40	-2,906,59	60,004.31	-48.40	2,343.89
LT/Assets	0.48	0.27	105.15	0	2.50	35.88	1,407.50
RD/Sales	0.53	0.15	127.07	-2.10	4.12	24.35	680.25
ADV/Sales	0.11	0.001	28.57	-0.12	0.70	29.89	1,162.04

Panel B: Descriptive statistics of variables in the non net firms data set

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Age	4,79	4	13	1	2,04	1,13	4,26
Sales	166,63	61,11	4.819	0,02	340,64	6,27	58,54
Assets	336,19	108,73	24.961,8	0,24	1.145,64	15,37	289,58
NI_BE	-17,67	-0,94	276,05	2.251	96,70	-11,16	191,95
LT	208,64	29,20	22.292	0	1.014,29	16,86	334,02
LTD	109,82	1,35	18.671	0	782,35	18,27	385,71
RD	11,54	1,7	279,98	0	24,74	4,83	36,42
ADV	3,31	0	5.271	0	107,39	48,95	2.401,7
BVE	139,69	63,82	4.039,5	-515,6	283,33	6,47	60,30
MVE/BVE	4,09	1,96	7.057,30	-3.544,20	162,66	29,46	1.560,34
LT/Assets	0,45	0,36	4,86	0	0,37	2,9	22,74
RD/Sales	1,57	0,04	1.109,9	0	24,84	39,29	1.686,90
ADV/Sales	0,06	0	60,09	0	1,36	38,07	1.680,10

Notes: Descriptive statistics of variables are based on panel data over the period 1996 until 2003. The variables are in millions of dollars unless ratios. Age is the number of the years of the firm after go public. For definition of the variables, see appendix A.

TABLE 5
Differences between means and medians in net firms sample: profits firms and losses firms (the variables are in millions of dollars, unless ratios)
PANEL A: Means†

Variables / Period	N	Age	MVE		BVE		NI_BE		Sales		RD		ADV		RD/ Sales		ADV/ Sales	
1996: Profit	34	1.75	480.5	**	86.2	*	11.09	**	205.6	**	5.06	ns	0.17	ns	0.075	ns	0.004	*
Losses	37	1.53	145.8		26.8		-14.7		24.46		4.12		0.70		4.402		0.052	
1997: Profit	49	2.23	583.9	*	89.9	*	12.98	**	183.9	**	7.79	ns	1.31	ns	0.069	ns	0.008	*
Losses	66	1.95	244.9		40.4		-20.7		46.2		5.10		1.41		1.223		0.063	
1998: Profit	47	2.27	469.4	ns	90.9	ns	12.77	**	194.1	**	8.69	ns	2.56	ns	0.065	ns	0.016	*
Losses	107	2.72	610.8		81.2		-27.3		62.8		7.58		2.16		0.671		0.097	
1999: Profit	80	2.61	4,055.5	*	181.6	ns	18.35	**	210.8	**	11.6	**	5.12	ns	0.07	ns	0.025	ns
Losses	350	1.63	2,184.1		144.8		-42.4		59.5		6.19		4.14		0.798		0.298	
2000 Profit	74	3.07	1,207.5	*	259.5	ns	22.6	**	279.6	**	12.6	ns	9.95	ns	0.09	**	0.026	*
Losses	453	2.13	644.4		337.7		-133.1		109.3		16.9		6.93		0.37		0.204	
2001: Profit	36	4.06	1,207.1	**	255.6	ns	20.0	**	267.7	**	14.2	ns	7.35	ns	0.081	ns	0.022	ns
Losses	392	3.10	374.6		160.2		-169.8		133.6		20.7		5.10		0.439		0.064	
2002: Profit	54	4.49	1,001.2	**	288.9	**	24.6	**	256.7	*	14.3	ns	10.6	**	0.082	*	0.026	ns
Losses	313	4.14	220.2		130.4		-98.6		136.0		19.1		3.3		0.387		0.029	
2003: Profit	101	5.49	1,798.7	**	301.5	**	29.3	**	315.7	**	21.1	ns	9.94	**	0.09	ns	0.015	ns
Losses	206	5.19	306.1		89.3		-41.8		113.8		15.9		1.83		0.69		0.014	
Panel: Profit	475	4.28	1,586.7	**	211.3	ns	20.4	**	235.4	**	13.0	ns	6.57	**	0.093	*	0.022	**
Data Losses	1924	4.57	740.64		174.6		-96.9		118.1		14.8		4.34		0.633		0.133	

† - T-statistics testing for a difference in means (assumed unequal variance). N is the number of firms in which group. (**) and (*) identify differences statistically significant at on 1% and 5% respectively. (ns) denotes a difference that is not statistically significant. For definition of the variables, see appendix A.

PANEL B: Medians†

Variables / Period	N	Age	MVE		BVE		NI_BE		Sales		RD		ADV		R&D/ Sales		Adv/ Sales	
1996: Profit	34	1	272.05	**	59.23	**	5.10	**	71.24	**	4.27	Ns	0.00	ns	0.022	**	0.000	ns
Losses	37	1	105.19		21.02		-8.45		10.18		1.96		0.00		0.234		0.000	
1997: Profit	49	2	229.27	**	49.55	**	4.92	**	80.19	**	0	Ns	0.00	ns	0.000	**	0.000	ns
Losses	66	2	111.54		18.27		-10.78		16.90		1.23		0.00		0.193		0.000	
1998: Profit	47	2	251.19	ns	48.87	ns	7.67	**	106.1	**	0.2	Ns	0.00	ns	0.003	**	0.000	ns
Losses	107	2	168.71		42.47		-11.29		22.31		1.13		0.00		0.123		0.000	
1999: Profit	80	1	825.89	ns	93.10	**	7.09	**	102.7	**	2.00	Ns	0.00	ns	0.011	**	0.000	**
Losses	350	2	678.28		56.00		-19.35		21.28		2.34		0.09		0.161		0.005	
2000: Profit	74	2	249.93	**	116.9	*	8.83	**	129.2	**	4.96	ns	0.00	ns[6)]	0.069	**	0.000	**
Losses	453	2	100.74		84.95		-36.47		39.87		6.63		0.38		0.200		0.014	
2001: Profit	36	3	459.78	**	119.7	*	7.49	**	136.3	**	5.14	ns	0.03	ns	0.036	**	0.001	ns
Losses	392	3	76.69		56.65		-40.65		47.96		7.76		0.27		0.198		0.006	
2002: Profit	54	4	261.74	**	69.77	**	10.87	**	107.8	**	2.79	ns	0.04	ns	0.027	**	0.001	ns
Losses	313	4	52.73		41.63		-20.13		48.62		6.38		0.06		0.184		0.002	
2003: : Profit	101	5	461.24	**	100.7	**	10.32	**	104.3	**	5.77	ns	0.04	ns	0.080	**	0.001	ns
Losses	206	5	107.37		23.92		-12.09		43.53		4.73		0.00		0.182		0.000	
Panel: Profit	475	4	368.29	**	81.63	**	7.42	**	98.53	**	3.56	ns	0.01	**	0.033	**	0.000	**
Data Losses	1924	4	128.40		48.63		-24.29		33.75		4.89		0.06		0.185		0.002	

† Z- Statistics on Wilcoxon 2-sample rank sums test for a difference in medians (normal approximation). N is the number of firms in which group. (**) and (*) identify differences statistically significant at on 1% and 5% respectively. (ns) denotes a difference that is not statistically significant. For definition of the variables, see appendix A.

TABLE 6
Differences between means and medians in non net firms sample: profits firms and losses firms (the variables are in millions of dollars, unless ratios)
PANEL A: Means†

Variables / Period	N	Age	MVE		BVE		NI_BE		Sales		RD		ADV	R&D/ Sales		Adv/ Sales	
1996: Profit	81	2,17	214,06		59,18		7,36	*	114,1	*	4,8		0,46	0,07	*	0,004	*
Losses	62	1,76	131,55		43,70		-7,11	*	64,27		5,36		0,50	0,84		0,03	
1997: Profit	109	2,36	307,54		70,05	**	8,80	*	256,0	**	4,9		0,30	0,06		0,003	*
Losses	82	2,41	175,83		37,58		-13,7	*	48,67		6,25		0,60	6,51		0,017	
1998: Profit	120	3,09	452,59	*	92,19	**	12,71	*	200,5	**	5,81		0,82	0,04		0,004	
Losses	92	2,83	126,73		40,11		-17,13	*	41,4		8,23		0,41	13,38		0,171	
1999: Profit	182	2,72	441,34	*	86,50		10,48	*	174,7	**	4,83	*	0,94	0,05		0,005	
Losses	174	2,44	803,44		107,2		-23,44	*	86,36		7,8		0,87	1,63		0,40	
2000: Profit	195	3,30	494,29		111,5		13,93	*	214,8	**	6,85	**	1,02	0,05	**	0,005	
Losses	250	2,55	443,74		156,4		-51,52	*	105,4		13,0		1,23	2,2		0,08	
2001: Profit	140	4,35	607,92	**	146,7		14,26	*	243,8	**	11,2	*	1,51	0,07	**	0,006	
Losses	262	3,61	339,06		161,7		-64,55	*	139,3		17,9		0,92	1,87		0,012	
2002: Profit	145	5,49	378,91	**	157,7		16,75	*	292,1	**	9,81	**	1,76	0,06	**	0,006	
Losses	229	4,52	170,60		132,4		-65,94	*	141,4		20,4		1,18	1,63		0,018	
2003: Profit	146	5,18	684,32	**	230,2	**	23,91	*	357,9	**	15,0	**	38,3	0,06	*	0,137	
Losses	190	5,24	306,77		100,6		-37,56	*	145,2		19,7		1,64	1,67		0,013	
Panel: Profit	1118	4,28	466,77	**	123,4		13,97	*	225,8	**	8,16	**	5,9	0,06	**	0,022	
Data : Losses	1341	4,98	351,35		118,6		-44,18	*	111,6		14,4		1,04	2,88		0,089	

† - T-statistics testing for a difference in means (assumed unequal variance). N is the number of firms in which group. (**) and (*) identify differences statistically significant at on 1% and 5% respectively. (ns) denotes a difference that is not statistically significant. For definition of the variables, see appendix A.

PANEL B: Medians†

Variables / Period	N	Age	MVE		BVE		NI_BE		Sales		RD		ADV	R&D/ Sales		Adv/ Sales
1996: Profit	81	2	123,01	*	38,5	**	4,79	**	59,53	**	0,51		0	0,018		0
Losses	62	1	66,13	*	23,88		-3.83		16,28		0,62		0	0,044		0
1997: Profit	109	2	126,59	*	45,89	**	4,19	**	77,24	**	0,05	*	0	0,0004	**	0
Losses	82	2	58,22	*	23,01		-6,19		18,33		2,67		0	0,125		0
1998: Profit	120	2	102,08	*	52,45	**	5,71	**	94,98	**	0	**	0	0	**	0
Losses	92	3	50,19	*	25,69		-7,45		27,2		4,31		0	0,14		0
1999: Profit	182	2	142,6		57,41	**	5,84	**	88,49	**	0	**	0	0	**	0
Losses	174	2	163,75		37,89		-10,08		24,82		2,34		0	0,11		0
2000: Profit	195	2,5	151,76		72,52		7,03	**	115,8	**	0	**	0	0	**	0
Losses	250	2	149,13		74,94		-18,61		32,56		7,18		0	0,189		0
2001: Profit	140	4	246,41	*	116,7	**	8,44	**	131,0	**	0	**	0	0	**	0
Losses	262	3	120,25	*	63,75		-20,36		38,34		8,61		0	0,184		0
2002: Profit	145	5	158,98	*	96,97	**	7,02	**	124,2	**	0	**	0	0	**	0
Losses	229	4	70,92	*	50,11		-22,26		39,3		10,2		0	0,212		0
2003: Profit	146	5	297,79	*	147,2	**	9,48	**	152,1	**	0	**	0	0	**	0
Losses	190	4	134,46	*	48,82		-14,9		48,13		8,41		0	0,196		0
Panel: Profit	1118	4	158,0	*	67,38	**	6,32	**	103,8	**	0	**	0	0	**	0
Data: Lossess	1341	4	101,66	*	46,95		-14,67		33,53		5,81		0	0,176		0

† Z- Statistics on Wilcoxon 2-sample rank sums test for a difference in medians (normal approximation). N is the number of firms in which group. (**) and (*) identify differences statistically significant at on 1% and 5% respectively. (ns) denotes a difference that is not statistically significant. For definition of the variables, see appendix A.

Table 7
Changes over time of the principal characteristics of net firms sample set

		1996	1997	1998	1999	2000	2001	2002	2003	Trend Sig.
Number of sample firms		71	115	154	430	527	428	367	307	
Age:	Mean	1,65	2,06	2,40	1,81	2,28	3,18	4,19	5,29	***
	Median	1,00	2,00	2	1,00	2,00	3,00	4,00	5,00	**
Sales	Mean	111,16	104,9	102,82	87,65	133,20	144,86	153,77	180,22	**
	Median	26,76	0	38,09	26,20	46,87	52,04	56,52	65,50	***
			35,25							
Assets	Mean	118,42	143,5	161,67	299,25	551,33	342,67	352,20	408,18	**
	Median	52,90	1	60,13	86,27	127,82	91.39	95,55	90,76	*
			57,54							
NI_BE	Mean	-2,37	-6,33	-15,04	-31,07	-	-153,85	-80,56	-18,44	
	Median	-0,83	-3,07	-5,53	-13,65	111,20	-34,91	-15,23	-4,73	
						-28,76				
LT	Mean	62,57	79,64	89,61	136,31	211,45	171,32	195,27	245,97	***
	Median	9,88	12,56	14,20	16,04	25,37	24,33	26,08	28,36	***
LTD	Mean	20,42	30,26	35,75	58,29	73,55	51,44	43,18	42,08	
	Median	0,16	0,21	0.10	0.36	0.29	0,13	0,05	0,05	
RD	Mean	4,57	6,25	7,92	7,20	16,30	20,12	18,38	17,65	**
	Median	3,08	1,15	1,13	2,34	6,43	7,65	6,05	5,20	**
ADV	Mean	0,45	1,37	2,28	4,32	7,29	5,29	4,34	4,50	*
	Median	0,00	0,00	0,00	0,00	0,33	0,26	0,06	0,00	
BVE	Mean	55,22	61,46	70,24	151,61	326,75	168,22	153,76	159,12	
	Median	31,22	35,56	37,75	60,41	90,47	58,73	47,49	47,70	
MVE/BVE	Mean	5,54	6,33	8,08	16,70	2,21	2,64	2,18	5,01	
	Median	4,64	4,62	5,32	11,39	1,25	1,47	1,42	3,40	
LT/	Mean	0.53	0,55	0,55	0,46	0,38	0,50	0,55	0,60	
Assets	Median	0,19	0,22	0,24	0,19	0,20	0,27	0,27	0,32	**
RD/ Sales	Mean	0,04	0,06	0,08	0,08	0,12	0,14	0,12	0,10	**
	Median	0,12	0,03	0,03	0,10	0,14	0,15	0,11	0,08	
ADV/SALES	Mean	0,004	0,013	0,0222	0,0493	0,0548	0,0365	0,0282	0,025	
	Median	0,00	0,00	0,00	0,00	0,007	0,005	0,001	0,000	

We test the significance of the changes over time by regressing each characteristics on annual time trend, and report, in the last column, the significance of the coefficient estimated for t. We use OLS to test trend in means and medians regressions.
Notes: The variables are in millions of dollars unless ratios. Age is the number of the years of the firm after go public. For definition of the variables, see appendix A.

Table 8
Changes over time of the principal characteristics of non net firms sample set

		1996	1997	1998	1999	2000	2001	2002	2003	Trend Sig.
Number of sample firms		143	191	212	356	445	402	374	336	
Age:	Mean	1,99	2,38	2,98	2,59	2,87	3,86	4,89	5.,21	***
	Median	1,00	2,00	3,00	2,00	2,00	3,00	4,00	4,00	***
Sales	Mean	92,47	109,9	131,44	131,53	153,32	175,67	199,78	237,63	***
	Median	41,41	4	60,31	55,57	56,47	64,23	67,97	82,42	***
			44,.36							
Assets	Mean	111,38	130,0	199,55	291,07	356,36	397,74	409,51	466,69	***
	Median	49,51	5	81,89	93,63	122,87	137,20	146,69	159,55	***
			59,84							
NI_BE	Mean	1,08	-0.86	-0.24	-6,10	-22,84	-37,11	-33,88	-10,85	**
	Median	0,92	0,85	1,50	0,25	-2,49	-5,67	-3,04	-1,69	**
LT	Mean	58,15	72,72	127,88	187,58	208,77	235,91	261,85	306,06	***
	Median	12,38	17,73	25,48	27,88	29,27	31,15	34,12	41,83	***
LTD	Mean	21,85	23,52	36,77	88,00	109,67	132,32	152,95	177,12	***
	Median	0.56	0,97	1,45	1,76	1,18	0,98	1,41	0,91	
RD	Mean	5,05	5,48	6,86	6,28	10,28	15,57	16,20	17,66	***
	Median	0.51	0.96	0.004	0,00	2,44	4,81	5,20	4,01	**
ADV	Mean	0,48	0,43	0,64	0,91	1,14	1,12	1,40	17,58	*
	Median	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
BVE	Mean	52,47	56,11	69,59	96,61	136,76	156,49	142,20	156,89	***
	Median	33,78	37,43	44,35	60,66	73,20	73,18	66,84	74,39	***
MVE/BVE	Mean	3,40	4,47	4,47	6,40	3,41	2,77	1,77	3,00	
	Median	2,77	2,76	1,99	2,95	2,04	2,05	1,35	2,71	
LT/	Mean	0,52	0,56	0,64	0,64	0,59	0,59	0,64	0,66	**
Assets	Median	0,25	0,30	0,31	0,30	0,24	0,23	0,23	0,26	
RD/ Sales	Mean	0,055	0,05	0,0522	0,0478	0,067	0,0886	0,0811	0,0743	**
	Median	0,012	0,022	0,0001	0,000	0,0431	0,0749	0,0765	0,0487	**
ADV/SALES	Mean	0,005	0,004	0,005	0,007	0,007	0,006	0,007	0,074	
	Median	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	

We test the significance of the changes over time by regressing each characteristics on annual time trend, and report, in the last column, the significance of the coefficient estimated for t. We use OLS to test trend in means and medians regressions.
Notes: The variables are in millions of dollars unless ratios. Age is the number of the years of the firm after go public. For definition of the variables, see appendix A.

TABLE 9
Regressions for hypothesis 1: net firms sample set

Year	Profit group				Loss group			
	N	Intercept	NI_BE	Adj. R^2 (%)	N	Intercept	NI_BE	Adj. R^2 (%)
1996	34 (2)	5,05*** (28,20)	0,05*** (5,215)	44,26	37 (0)	4,08*** (17,195)	-0.026*** (-3,838)	16,23
1997	49 (1)	5,06*** (30,462)	0,037*** (5,781)	40,31	66 (0)	3,94*** (16,762)	-0.022*** (-2,978)	19,85
1998	47 (1)	4,84*** (21,714)	0,047*** (4,268)	27,24	107 (4)	4,67*** (25,452)	-0.014*** (-4,351)	14,47
1999	80 (5)	6,44*** (31,475)	0,02*** (3,532)	12,68	350 (16)	6,19*** (59,44)	-0.005*** (-4,227)	6,94
2000	74 (2)	5,08*** (25,246)	0,022*** (4,859)	20,83	453 (3)	4,42*** (45,728)	-0.002*** (-4,065)	9,81
2001	36 (1)	5,40*** (21,72)	0,027*** (4,264)	32,93	392 (10)	4,15*** (39,645)	-0.001*** (-5,484)	8,20
2002	54 (5)	4,61*** (18,276)	0,03*** (5,468)	35,29	313 (12)	3,69*** (34,438)	-0.002*** (-3,318)	8,42
2003	101 (5)	5,50*** (37,112)	0,017*** (7,647)	36,50	206 (15)	4,07*** (30,818)	-0.007*** (-5,43)	12,20
Mean		5,25***	0,031***	31,25		4,402***	-0.01**	12,02
t-statistic		26,545	7,087			15,93	-2.859	

Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 NI\_BE_{i,t} + e_{it}$, where MVE is the market value of equity and NI_BE the net income before extraordinary items. In first column of each group we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic. Tstatistic is a mean divided by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags. *** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 10
Regressions for hypothesis 1: non net firms sample set

Year	Profit group				Loss group			
	N	Intercept	NI_BE	Adj. R^2 (%)	N	Intercept	NI_BE	Adj. R^2 (%)
1996	81 (2)	4,23*** (32,02)	0,07** (7,065)	40,20	62 (3)	3,46*** (17,761)	-0.078*** (-4,844)	26,90
1997	109 (5)	4,62*** (37,216)	0,033*** (3,107)	26,37	82 (2)	3,72*** (17,725)	-0.015 (-1,647)	5,30
1998	120 (0)	4,43*** (42,447)	0,034*** (9,499)	42,85	92 (1)	3,84*** (22,658)	-0.005 (-1.301)	1,00
1999	182 (5)	4,52*** (35,439)	0,051*** (5.772)	25,34	174 (9)	4,74*** (25,706)	-0.012** (-2.124)	9,00
2000	195 (6)	4,18*** (31,46)	0,058*** (8.699)	38,14	250 (6)	4,52*** (32,028)	-0.003** (-2.029)	4,20
2001	140 (4)	4,52*** (34,919)	0,060*** (10,152)	47,79	262 (10)	4,28*** (37,117)	-0.004*** (-5.975)	11,74
2002	145 (3)	4,44*** (34,68)	0,036*** (5,691)	40,12	229 (10)	3,83*** (29,525)	-0,002** (-2,201)	5,70
2003	146 (4)	5,09*** (39,077)	0,023*** (5,700)	36,52	190 (12)	4,34*** (31,365)	-0,011*** (-5,122)	18,54
Mean		4,505***	0,0456***	37,17		4,09***	-0,016	10,30
t-statistic		45,437	7,87			25,995	-1,832	

Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 NI\_BE_{i,t} + e_{it}$, where MVE is the market value of equity and NI_BE the net income before extraordinary items. In first column of each group, we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic which is calculated divided the mean by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 11

Panel A: Matrix of correlations for hypothesis 2: net firms sample set

Loss group (N=1924)	MVE	BVE	NI	NI_BE	RD	ADV	Profit group (N=475)	MVE	BVE	NI	NI_BE	RD	ADV
MVE	1	0.588**	-0.3**	-0.311**	0.327**	0.111**	MVE	1	0.676**	0.627**	0.65**	0,407**	0.241**
BVE	0.401**	1	-0.717**	-0.699**	0.385**	0.190**	BVE	0.482**	1	0.539**	0.585**	0,377**	0.193**
NI	-0.151**	-0.666**	1	0.976**	-0.323**	-0.232**	NI	0.381**	0.622**	1	0.967**	0.216**	0.174**
NI_BE	-0.155**	-0.675**	0.99**	1	-0.321**	-0.236**	NI_BE	0.395**	0.715**	0.936**	1	0.217**	0.181**
RD	0.262**	0.381**	-0.379**	-0.389**	1	0.132**	RD	0.456**	0.537**	0.466**	0.490**	1	0.282**
ADV	0.133**	0.152**	-0.19**	-0.192**	0.084**	1	ADV	0.507**	0.737**	0.590**	0.642**	0.526**	1

Numbers above the diagonal represent Pearson correlations, and below the diagonal Spearman rank correlations.

(**) and (*) Indicates significance at 1% and 5%, respectively

Panel B: Matrix of correlations for hypothesis 2: Non net firms sample set

Loss group (N=1341)	MVE	BVE	NI	NI_BE	RD	ADV	Profit group (N=1118)	MVE	BVE	NI	NI_BE	RD	ADV
MVE	1	0,714**	-0,445**	-0,473**	0,443**	-0,09**	MVE	1	0,732**	0,693**	0,700**	0,345**	0,031
BVE	0,495**	1	-0,665**	-0,651**	0,381**	-0,065**	BVE	0,515**	1	0,609**	0,632**	0,193**	0,051
NI	-0,183**	-0,633**	1	0,962**	-0,347**	-0,015	NI	0,626**	0,508**	1	0,972**	0,102**	0,073**
NI_BE	-0,198**	-0,628**	0,965**	1	-0,350**	-0,021	NI_BE	0,678**	0,599**	0,892**	1	0,095**	0,072**
RD	0,188**	0,390**	-0,184**	-0,183**	1	-0,0133**	RD	0,629**	0,519**	0,553**	0,599**	1	0,011
ADV	0,098**	0,124**	-0,384**	-0,385**	-0,039	1	ADV	0,003	0,019	0,022	0,023	-0,007	1

Numbers above the diagonal represent Pearson correlations, and below the diagonal Spearman rank correlations.

(**) and (*) Indicates significance at 1% and 5%, respectively

TABLE 12
Regressions for hypothesis 2: net firms sample set

	Profit group					Loss group				
Year	N	Intercept	BVE	NI_BE	Adj. R^2 (%)	N	Intercept	BVE	NI_BE	Adj. R^2 (%)
1996	34 (2)	5,03*** (27,07)	0,0005 (0,426)	0,049*** (4,682)	42,79	37 (0)	3,45*** (13,589)	0,022*** (3,664)	-0,007 (-0,471)	46,53
1997	49 (1)	4,89*** (28,278)	0,003** (2,424)	0,032*** (4,96)	45,92	66 (0)	3,79*** (16,799)	0,006* (1,856)	-0,012*** (-3,194)	28,63
1998	47 (1)	4,59*** (20,551)	0,008*** (2,898)	0,012 (0,781)	37,51	107 (4)	4,33*** (24,347)	0,006*** (5,093)	-0,008** (-2,533)	30,88
1999	80 (5)	6,17*** (28,276)	0,0028** (2,412)	0,001** (2,062)	28,74	350 (16)	6,12*** (62,868)	0,001*** (4,597)	-0,004*** (-3,813)	12,03
2000	74 (2)	4,79*** (19,526)	0,002*** (4,612)	0,013*** (2,928)	35,77	453 (3)	4,38*** (46,144)	0,001*** (3,072)	-0,0002 (-0,59)	16,80
2001	36 (1)	5,23*** (21,683)	0.002*** (2,534)	0,016*** (2,237)	42,15	392 (10)	3,92*** (35,277)	0,002*** (3,937)	0,001** (1,98)	23,82
2002	54 (5)	4,64*** (16,392)	0,001** (2,221)	0,016* (1,959)	36,51	313 (12)	3,47*** (27,47)	0,003*** (3,549)	0,003** (2,423)	24,91
2003	101 (5)	5,50*** (34,726)	0,0004 (0,639)	0,014** (2,195)	36,74	206 (15)	3,94*** (30,24)	0,004*** (7,214)	0,002 (1,176)	29,54
Mean[2)]		5,11	0,0024	0,02	38,27		4,174	0,005	-0,003	26,65
t-statistic		27,364***	2,897**	4,271***			13,795***	2,21**	-1,598	

Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{it-1} + \alpha_2 NI\_BE_{i,t} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity and NI_BE the net income before extraordinary items. In first column of each group, we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic which is calculated divided the mean by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags. *** and ** denote significance at the 1% and 5% levels (two-side) respectively.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 13
Regressions for hypothesis 2: non net firms sample set

Year	Profit group					Loss group				
	N	Intercept	BVE	NI_BE	Adj. R^2 (%)	N	Intercept	BVE	NI_BE	Adj. R^2 (%)
1996	81	3,94***	0,011***	0,0354***	55,83	62	3,23***	0,014***	-0,008	49,82
	(2)	(34,521)	(5,381)	(3,412)		(3)	(19,331)	(5,328)	(-0,422)	
1997	109	4,19***	0,011***	0,003	47,80	82	3,30***	0,016***	0,012	35
	(5)	(37,474)	(6,706)	(0,455)		(2)	(13,147)	(3,271)	(1,45)	
1998	120	4,17***	0,006***	0,018***	50,28	92	2,87***	0,023***	0,014***	44,15
	(0)	(34,661)	(3,058)	(3,058)		(1)	(16,749)	(8,422)	(3,586)	
1999	182	4,39***	0,003***	0,04***	29,06	174	4,51***	0,003***	-0,008**	22,18
	(5)	(32,935)	(3,179)	(4,185)		(9)	(25,981)	(2,592)	(-2,212)	
2000	195	3,95***	0,005***	0,039***	44,07	250	4,22***	0,002***	-0,0001	20,46
	(6)	(28,511)	(3,615)	(4,794)		(6)	(28,183)	(5,09)	(-0,094)	
2001	140	4,35***	0,003***	0,046***	54,20	262	4,08***	0,003***	0,020**	28,54
	(4)	(36,488)	(4.,199)	(11,236)		(10)	(34,220)	(6,199)	(2,464)	
2002	145	4,25***	0,003***	0,025***	48,89	229	3,52***	0,003***	0,002***	25,74
	(3)	(33,963)	(3,339)	(4,034)		(10)	(29,332)	(6,062)	(2,85)	
2003	146	4,94***	0,002***	0,016***	44,21	190	4,12***	0,002***	-0,005***	29,22
	(4)	(36,664)	(4,827)	(3,532)		(12)	(31,341)	(5,059)	(-2,65)	
Mean[2)]		4,274***	0,005***	0,028***	**46,79**		3,74***	0,008**	0,003	31,89
t-statistics		38,181	4,117	5,235			17,993	2,841	0,867	

Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{it-1} + \alpha_2 NI\_BE_{i,t} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity and NI_BE the net income before extraordinary items In first column of each group, we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic which is calculated divided the mean by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 14
Regressions for hypothesis 3: net firms sample set

	Profit group						Loss group					
Year	N	Intercept	BVE	NIB_RD	RD	Adj. R^2 (%)	N	Intercept	BVE	NIB_RD	RD	Adj. R^2 (%)
1996	34	4,92***	-0.0006	0.044***	0.006	45,95	37	3,45***	0,022***	-0,007	0,002	44,97
	(2)	(25,492)	(-0,489)	(4,106)	(0,176)		(0)	(15,337)	(4,306)	(-0,78)	(0,091)	
1997	49	4,88***	0.007	0.03***	-0.011	49,16	66	3,68***	0,005	-0,011***	0,047**	31,59
	(1)	(29,03)	(1,268)	(4,674)	(-0,898)		(0)	(15,772)	(1,508)	(-3,741)	(2,69)	
1998	40	4,69***	0.007**	0.019	-0.022	39,23	89	4,24***	0,005***	-0,008**	0,023***	29,53
	(1)	(19,822)	(2,561)	(0,856)	(-0,633)		(4)	(21,303)	(3,325)	(-2,078)	(2,213)	
1999	64	5,94***	0.0067***	-0.006	0.018*	35,74	258	6,11***	0,001***	-0,002	0,038***	18,14
	(3)	(26,163)	(4,128)	(-0,884)	(1,822)		(11)	(44,344)	(3,763)	(-1,424)	(3,566)	
2000	59	4,51***	0.003***	0.007*	0.018	34,96	343	4,53***	0,0004***	-0,0002	0,007**	21,74
	(1)	(15,135)	(3,44)	(1,869)	(1,045)		(1)	(41,304)	(2,864)	(-0,518)	(2,047)	
2001	36	5,15***	0.001	0.019**	-0.003	45,30	314	4,07***	0,001***	0,001**	0,006	25,24
	(1)	(21,636)	(1,016)	(2,603)	(-0,324)		(6)	(30,274)	(3,539)	(2,558)	(0,994)	
2002	44	4,61***	0.002	0.026**	-0.024	36,29	265	3,43***	0,002***	0,004***	0,009	30,27
	(3)	(17,597)	(1,364)	(2,276)	(-1,349)		(8)	(27,025)	(4,133)	(3,923)	(1,551)	
2003	88	5,39***	0.0002	0.011**	0.002	46,77	183	3,96***	0,004***	0,003	-0,003	30,68
	(4)	(39,851)	(0,576)	(2,475)	(0,371)		(13)	(31,341)	(6,636)	(1,316)	(-0,948)	
Mean		5,011***	0.0032**	0.019**	-0.002	41,68		4,183***	0,005**	-0,002	0,016**	29,02
t-statistic		29,89	2.853	3.497	-0.362			13,681	2,019	-1,288	2,52	

Notes: Notes: Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_RD_{it} + \alpha_3 RD_{it} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity, NIB_RD the net income before research expenses and RD the research expenses In first column of each group, we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic which is calculated divided the mean by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 15
Regressions for hypothesis 3: non net firms sample set

Year	Profit group – B2B sub-sample						Loss group - B2B sub-sample					
	N	Intercept	BVE	NIB_RD	RD	Adj. R^2 (%)	N	Intercept	BVE	NIB_RD	RD	Adj. R^2 (%)
1996	81	3,93***	0,011***	0,039***	-0,04*	55,32	62	3,15***	0,014***	0,004	0,025	51,78
	(2)	(33,04)	(5,359)	(2,784)	(-1,946)		(3)	(18,704)	(5,462)	(0,206)	(1,212)	
1997	109	4,19***	0,011***	0,0005	0,014	48,19	82	3,08***	0,015***	0,013	0,029*	39,75
	(5)	(37,616)	(5,894)	(0,078)	(0,984)		(2)	(11,332)	(3,1)	(1,646)	(1,866)	
1998	120	4,17***	0,006***	0,01*	0,007	52,67	92	2,69***	0,019***	0,01***	0,031**	50,53
	(0)	(37,27)	(4,473)	(1,713)	(0,64)		(1)	(15,966)	(6,834)	(2,819)	(2,357)	
1999	157	4,42***	0,003*	0,024**	0,0001	32,56	155	4,25***	0,001***	-0,017***	0,053***	28,00
	(4)	(30,923)	(1,907)	(2,088)	(0,004)		(9)	(25,833)	(2,705)	(-3,812)	(5,472)	
2000	173	4,00***	0,005***	0,031***	-0,022*	44,44	214	3,95***	0,002***	-0,0002	0,033***	30,96
	(5)	(26,887)	(3,313)	(3,931)	(-1,853)		(5)	(23,626)	(4,78)	(-0,410)	(4,753)	
2001	59	4,94***	0,001	0,034***	-0,025***	61,02	183	4,1***	0,002***	0,002	0,019***	38,88
	(1)	(31,769)	(1,139)	(4,801)	(-2,334)		(6)	(24,858)	(2,806)	(0,002)	(3,772)	
2002	56	4,67***	0,002***	0,012*	-0,005	59,10	164	3,38***	0,001**	0,001	0,025***	42,28
	(1)	(35,867)	(3,361)	(1,813)	(-0,473)		(5)	(26,556)	(1,902)	(0,884)	(5,960)	
2003	60	5,29***	0,001***	0,002	0,007	45,64	139	4,35***	0,001***	-0,0004	0,016***	38,23
	(3)	(31,663)	(2,501)	(0,397)	(0,844)		(5)	(37,03)	(2,916)	(-0,175)	(4,373)	
Mean		4,452***	0,005**	0,019**	-0,008	49,87		3,619***	0,007**	0,002	0,029***	40,05
t-statistics		26,279	3,523	3,618	-1,12			16,506	2,533	0,471	7,075	

Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_RD_{it} + \alpha_3 RD_{it} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity, NIB_RD the net income before research expenses and RD the research expenses. In first column of each group, we report in parenthesis the number of firms with negative BVE. The regressions are run for each year using all firms for the year on all variables in the model. T-Statistics for all years are in parenthesis. The last two rows show mean (across years) of the regressions intercepts and slopes and t-statistic which is calculated divided the mean by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 16
Regressions for hypothesis 3

Year	Profit group N	Loss group – B2C sub-sample N	Intercept	BVE	NIB_ADV	ADV	Adj. R^2 (%)
1998	7	18	4,28***	0,006***	-0,003	0,06***	56,64
		(0)	(11,377)	(4,756)	(-1,229)	(5,033)	
1999	16	92	5,28***	0,004***	-0,002	0,008	27,04
	(2)	(5)	(27,533)	(4,352	(-0,932)	(0,83)	
2000	15	110	3,15***	0,001**	0,0004	0,018***	27,23
	(1)	(2)	(16,983	(2,289)	(1,398)	(4,673)	
2001	0	78	2,85***	0,003***	0,0021**	0,019***	42,54
		(4)	(12,123	(3,598)	(2,046)	(3,221)	
2002	10	48	2,75***	0,004***	0,003	0,012	40,10
	(2)	(4	(9,764)	(4,251)	(0,943)	(1,354))	
2003	13	23	3,41***	-0,0002	-0,013	0,038***	28,47
	(1)	(2)	(8,377)	(-0,0002)	(-1,927)	(3,344)	
Mean			3,618***	0,003*	-0,002	0,026*	37,00
t-statistics			5,417	3,218	-0,837	3,07	

Notes: Notes: Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_ADV_{it} + \alpha_3 ADV_{it} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity, NIB_ADV the net income before advertising expenses and ADV the research expenses. In parenthesis we report the number of firms with negative BVE at the end of the year. T-statistics is a mean divided by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{T/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags. *** and ** denote significance at the 1% and 5% levels (two-side) respectively.

TABLE 17
Regressions for hypothesis 3: non net firms sample set

Year	Profit group - B2C sub-sample						Loss group - B2C sub-sample					
	N	Intercept	BVE	NIB_ADV	ADV	Adj. R^2 (%)	N	Intercept	BVE	NIB_ADV	ADV	Adj. R^2 (%)
1999	25	4,01***	-0,0001	0,08***	-0,056	34,4	19	2,92***	0,006***	-0,004	0,071	53,82
	(1)	(8,767)	(-0,016)	(4,0)	(-1,07)		(0)	(4,285)	(4,426)	(-0,885)	(1,074)	
2000	22	3,11***	-0,001	0,13***	-0,151***	72,21	36	2,76***	0,003***	-0,001	0,055**	39,25
	(1)	(9,844)	(-0,032)	(6,853)	(-5,04)		(1)	(8,104)	(3,854)	(-0,515)	(2,305)	
2001	81	3,80***	0,005***	0,052***	-0,052**	52,94	79	3,18***	0,003***	0,001	0,09***	34,20
	(3)	(22,965)	(3,79)	(5,359)	(-2,285)		(4)	(13,981)	(2,711)	(1,077)	(2,963)	
2002	89	3,77***	0,003***	0,039***	-0,016	52,79	65	2,55***	0,007***	0,009***	0,071**	34,96
	(2)	(23,703)	(4,015)	(5,077)	(-0,819)		(5)	(8,73)	(4,105)	(3,085)	(2,408)	
2003	86	4,49***	0,002***	0,021***	-0,021***	52,43	51	3,48***	0,003***	-0,004	0,03	30,53
	(1)	(31,428)	(4,055)	(4,9)	(-4,852)		(7)	(12,614)	(2,368)	(-0,672)	(1,005)	
Mean		3,835***	0,002**	0,065**	-0,059**	52,95		2,98***	0,004***	0,0003	0,063***	38,55
t-statistics		21,778	2,242	4,3	-3,076			23,228	6,365	0,177	8,019	

Notes: Notes: Model estimate: $MVE_{it} = \alpha_0 + \alpha_1 BVE_{i,t-1} + \alpha_2 NIB\_ADV_{it} + \alpha_3 ADV_{it} + e_{it}$, where MVE is the market value of equity, BVE the book value of equity, NIB_ADV the net income before advertising expenses and ADV the research expenses. In parenthesis we report the number of firms with negative BVE at the end of the year. T-statistics is a mean divided by its standard error (the time-series standard deviation of the regression coefficient divided by $8^{1/2}$). The standards errors are corrected for autocorrelation by the method of New and West (1987) with 6 lags. *** and ** denote significance at the 1% and 5% levels (two-side) respectively.

Table 18: Test Chow for both samples (net an d non net firms) and groups (profit and loss making firms)

			Net firms		Non net firms	
			Profit	Loss	Profit	Loss
F-Statistic	H1	NI_BE	0,768248	24,25478*	0,768248	2,166920
(Probability)			0,521975	0.0058	0,5219750	0,230372
	H2	NI_BE	3,047133	0,901509	1,111436	2,994498
			0,157026	0,475130	0,413179	0,160353
		BVE	1,168684	2,976670	1,08116	0,901509
			0,398384	0,225748	0,421339	0,475130
	H3a	NIB_RD	8,690417**	0,316657	1,278034	1,003377
			0,03500	0,745309	0,372249	0,443446
		RD	0,332554	2,016040	2,002176	2,413599
			0,735185	0,248007	0,249728	0,205340
		BVE	4,089877	2,734522	2,236636	0,462926
			0,107856	0,178446	0,210745	0,659413
	H3b	NIB_ADV[1)]		1.578882	342,87320**	0,212925
				0,387765	0,038162	0,837458
		ADV[1)]		6,484058	13,08531	9,253719
				0,133617	0,191845	0,226412
		BVE[1)]		8,085916	48,8320	0,193750
				0,110060	0,100675	0,848953

[1)] For these group,' due the small number of observations, it was not possible estimate the model.
.*** and ** denote significance at the 1% and 5% levels (two-side) respectively.

Appendix A: List of variables

Variable description	**Label**	***Compustat annual data item***
Balance sheet		
"*Property, plant and equipment – total net value*"	PPE	**8**
"*Current assets - total*"	CA	**4**
"*Receivables-total"*	REC	**2**
"*Cash and equivalents*"	CASH	**1**
"*Current assets-others*"	AO	**68**
"*Assets – total "*"	ASSETS	**6**
"*Common equity –total*"	BVE	**60**
"*Retained earnings*"	RE	**36**
"*Long-term debt –total*"	LTD	**9**
"*Current liabilities-total*"	CL	**5**
"*Liabilities-total*"	LT	**181**
Income Statement		
"*Depreciation and amortization"*	DEP	**14**
"*Selling, general, and administrative expense*"	SGA	**189**
"*Cost of goods sold"*	COGS	**41**
Advertising expenses"	Adv	**45**
"*Research and development expenses*"	R&D	**46**
"*Special items*"	SPEC	**17**
"*Income before extraordinary items – available for common*"	NI_BE	**237**
"*Net income (loss)"*	NI	**172**
"*Sales (net)*"	SALES	**12**
Others		
" Operating activities-net cash flows"	CFO	**308**
"*Market value of equity*"	MVE	MKVALF